“Itaku” Automotive Production：An Aspect of the Development of Full-Line and Wide-Selection Production by Toyota in the 1960s

AUTHOR(S):

SHIOJI, Hiromi

CITATION:

SHIOJI, Hiromi. “Itaku” Automotive Production：An Aspect of the Development of Full-Line and Wide-Selection Production by Toyota in the 1960s. The Kyoto University Economic Review 1996, 65(1): 19-42

ISSUE DATE:

1996-03

URL:

https://doi.org/10.11179/ker1926.65.19

"Itaku" Automotive Production:

An Aspect of the Development of Full-Line and Wide-Selection Production by Toyota in the 1960s*

by Hiromi SHIOJI**

I "Itaku" Assembly Firms

1 The Scale of "Itaku" Production at Toyota

It is well known that the ratio of outsourcing of automotive parts in the Japanese automotive industry is high compared to those of the industries in America and Europe. Compared to the outsourcing ratios in America which tend to be between 40-60% (based on the ratio of cost of goods), 60 to 80% of the parts in Japan are not produced by the auto manufacturer rather they are manufactured by first tier suppliers (who actually outbase a large proportion of the parts to second tier suppliers).

There is an important point concerning this topic that has been overlooked in research until now, that is the degree to which the assembly processes in automotive production (stamping, welding, painting and assembly) are outbased to companies completely or partly specializing in such work. Such companies are referred to as "itaku[1)]" assembly firms in Japan.

In the case of Toyota about 40-50% of the vehicles, for Nissan 20-30%, are not assembled in the auto manufacturers' facilities rather they are outbased. The data in Table 1 and Table 2 clearly point out that in 1970 as well as in 1989 the assembly processes were outbased for about half of all Toyota vehicles built during those years. That is to say, Table 1 shows Toyota group produced about 1.677 million in 1970 and "itaku" assembly firms produced totally about 859 thousand vehicles.

---

* This paper is a conflation, revision, and expansion of three earlier studies, Shioji, Hiromi "The Factory Development of Toyota Motor in the 1960's", *Economic Review* [Kyoto University Economic Society], vol. 37 no. 6, 1986, "Subcontracting of car assembly: An aspect of the Development of the full-line-wide-selection production system by Toyota in the 1960s", *Economic Review* [Kyoto University Economic Society], vol. 38 no. 5/6, 1986, and "Can a division of development transfer Kyushu area?", *Kyushu Economy Research*, October 1993.

** Associate Professor, Faculty of Economics, Kyoto University.

1) The term, "Itaku" in Japanese can be translated to consignment, outsourcing, subcontracting or entrusting.

Table 1 "Itaku" Production of Toyota in 1970

"Itaku" Firm	Production (vehicle)	% of Toyota Group Total (1,677,416)	
Toyota Shatai (Toyota Auto Body)	295,500	17.6	business year
Kanto Jidosha Kogyo (Kanto Auto Works)	280,476	16.7	business year
Arakawa Shatai Kogyo (Arakawa Auto Body)	41,374	2.5	calendar year
Toyoda Jidoshokki Seisakusho (Toyoda Automatic Loom Works)	49,991	3.0	business year
Yamaha Hatsudoki (Yamaha Motors)	71	0.004	calendar year
Central Jidosha (Central Motors)	52,803	3.1	calendar year
Hino Jidosha Kogyo (Hino Motors)	104,789	6.2	business year
Daihatsu Kogyo (Daihatsu Motor)	33,993	2.1	calendar year
total	858,997	51.2	

Source: Yuka shoken hokokusho of Toyota Shatai, Kanto Jidosha Kogyo, Toyoda Jidoshokki Seisakusho and Hino Jidosha Kogyo. *Arakawa Shatai 25 nenshi* (A History of Arakawa Shatai). Kazuo Tomiyama, *Nihon no Jidosha Sangyo* (Japanese Automobile Industry), Toyo Keizai Shinpo sha, 1973. Some materials from Central Jidosha and Daihatsu Kogyo.

Notes: Calendar year and business year are intermingled.

Table 2 Production Capacity of Toyota Plants and "Itaku" Firms in 1989

Toyota Plant/"Itaku" Firm	Production Capacity per year (1,000 vehicles)
[Toyota Plant]	
Honsha	228
Motomachi	420
Takaoka	732
Tsutsumi	432
Tahara	432
subtotal	2,244 (56.4%)
["Itaku" Firm]	
Toyota Shatai	396
Kanto Jidosha Kogyo	432
Araco, Gifu Shatai Kogyo, etc	64
Toyoda Jidoshokki Seisakusho	216
Central Jidosha	84
Hino Jidosha, Kogyo	312
Daihatsu Kogyo	228
subtotal	1,732 (43.6%)
total	3,976 (100.0%)

Source: "GM o koe Shin・Jidosha Okoku zukuri eno Fuseki" (Strategy for New Automobile Kingdom beyond GM) *Shukan Toyo Keizai* December 29, 1990-January 5, 1991 Gappeigo.

This was making up 51.2% of Toyota group total production[2]. In addition, Table 2 also shows that Toyota has assembly plants in Aichi prefecture and their subtotal of production capacity is 2.244 million in 1989, but it makes up only 56.4% of Toyota group's total capacity in Japan. On the other hand, the capacity of "itaku" firms is 1.732 million, making up 43.6% of Toyota group total.

Figure 1-1 illustrates the manufacturing process of the "itaku" firms. The "itaku" firms basically do not manufacture parts, rather they receive them from Toyota or parts suppliers. Thereafter, they are responsible for the assembly process that includes stamping, welding, painting, and finally assembly. After the process is finished they sell the complete vehicles to Toyota.

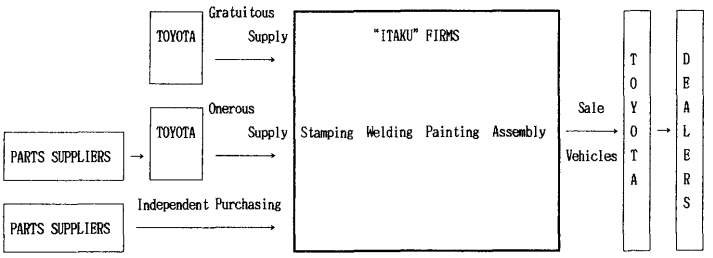


Figure. 1-1 The Manufacturing Process of "Itaku" Firms

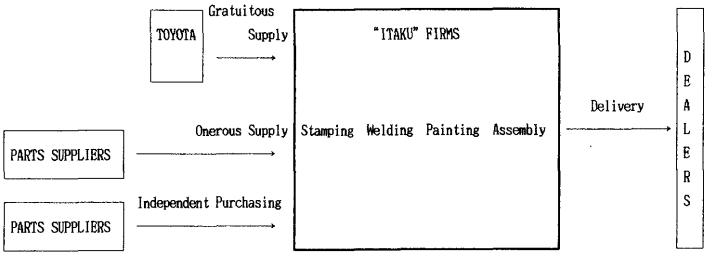


Figure. 1-2 The Actual Physical Flow of Parts and Vehicle

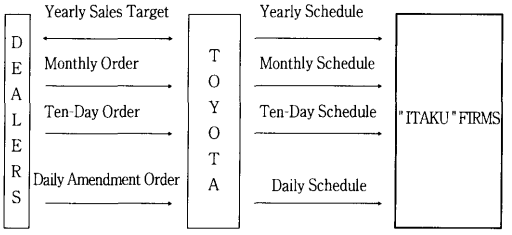


Figure. 1-3 Flow of Order Entry and Production Scheduling

Figure. 1 Parts Suppliers-Toyota-"Itaku" Firms-Dealers Relations

2) All of the vehicles produced by "itaku" firms are Toyota brand not each "itaku" firm's brand. However, some itaku firms attach their own brand plate inside the vehicle, for example engine room.

There are basically three methods of parts procurement. 1) The first method is referred to as "the Gratuitous Supply." Parts manufactured by Toyota are supplied directly to the "itaku" firms without charge. The main parts supplied in this manner are important parts such as engines, transmissions and so on. 2) The second method is referred to as "the Onerous Supply." Parts manufactured by parts suppliers are first purchased by Toyota and then supplied to the "itaku" firms with a charge. 3) The third method is referred to as "Independent Purchasing." The "itaku" firms purchase the parts directly from the parts suppliers. In this case the "itaku" firms are sometimes directly involved in the initial design and price negotiations for the parts. The composition ratios of these three methods are different among "itaku" firms, it depends on the history of each "itaku" firm. Generally speaking, the longer their history, the higher is their ratio of independent purchasing[3)].

When the "itaku" firms deliver assembled vehicles to Toyota, the transaction is one in which the "itaku" firms sell the vehicles to Toyota. The price varies according to the type of vehicle, however, it is surmised that the price is approximately 40% to 60% of the suggested retail price at auto dealers.

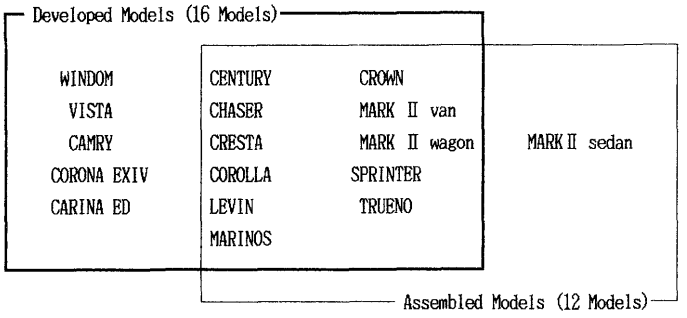
However, as seen in Figure 1-2, even though the "itaku" firms sell the vehicles to Toyota, the actual physical flow of the vehicles is directly from the "itaku" firms to the dealers.

Figure 1-3 illustrates the flow of production schedule and order entry. First, auto dealers agree to the yearly sales target proposed by Toyota. Then auto dealers give monthly orders and ten-day orders to Toyota. Receiving these orders, Toyota makes and gives the monthly schedules and ten-day schedules to each "itaku" firm. As the ten-day orders are not final and the ten-day schedules are provisional plan, after the ten-day order auto dealers can amend the ten-day order by as much as 50% until 3 days before the actual assembly day. This system is referred to as daily amendment order.

The high degree of outsourcing among Japanese auto manufacturers is not limited to the assembly processes. Actually, in the case of Toyota, 40% of the functions of the body development (product planning, design, drawing, proto-typing, testing) and the preparations for production (mold/jig design and manufacturing, test assembly) which are essential elements of auto manufacturing are outbased to the "Itaku" assembly firms.

For example, as seen in Figure 2, Kanto Jidosha Kogyo develops 16 models and assembles 12 models at present. In addition, it is interesting that 5 models (Windom and so on) developed by Kanto Jidosha are assembled at Toyota and other "itaku" firms. However, the actual testing of vehicles requires the use of wind tunnels, crash test facilities, high speed test tracks, and so on. Since the itaku

3) For example, Toyota Motor Kyushu is the newest one, its ratio of independent purchasing is zero. On the other hand, Kanto Jidosha Kogyo is one of the oldest "itaku" firms, its ratio is 20-40%. For further details of Toyota Motor Kyushu, see Shioji, Hiromi "Can a division of development transfer Kyushu area?", *Kyushu Economy Research*, October 1993.



Note: As of March, 1993.
Figure. 2 Models Developed and Assembled by Kanto Jidosha Kogyo

	Mass Production	Full-Line	Wide-Selection
US	1910s	1920s	1960s
Japan	1960s	1960s	1960s

Figure. 3 The Simultaneous and Parallel Development of the Three Factors in Japan

firms are unable to afford the large investment of building such grand testing facilities, they often use those belonging to Toyota.

2 Why is the Ratio of "itaku" Production in Japan So High?

Why has the ratio of outsourcing assembly been so high in Japan? First of all it can be pointed out that during the 1960s motorization advanced rapidly and the demand for vehicles increased by 10 folds over the decade. The use of "itaku" firms was a measure taken in response to Toyota's inability to increase the mass production capacity of its own facilities enough to keep up with this explosive growth in demand. However, the importance of "itaku" production is not limited to this function of supplementing the volume of production and the large proportion of this supplementary production.

The key to this problem is found in the historical context of the Japanese automotive industry during the 1960s. If we compare the timing of the introduction of the following three factors, 1) the development of mass production of vehicles, 2) the development of full-line production, and 3) the development of a wide-selection, we find differences between Japan and the U. S[4].

As seen in Figure 3, mass production developed in the U. S. during the 1910s, thereafter during the 20s full-line production was introduced, and finally after

4) Full-line production means that a particular automaker has a variety of vehicles, especially variety of passenger cars, from entry car to luxury car, from cheap to expensive ones. It is well known that General Motors' full-line policy started in 1920s. Wide-selection means that a particular car model has some kind of platform, variation of body types, many specifications and combinations of those.

World War II a wide-selection of vehicles was offered. However, in the case of Japan, in 1960 Toyota's annual production was around 170 thousand vehicles and thus they had not yet attained the level of mass production, which it reached later during the decade of the 60s. Likewise, Toyota only offered two passenger car models and 6 truck models in 1960 and full-line production was also attained later during the 60s. Furthermore, in the latter half of the 60s Toyota began to offer a wide-selection of each car model. Therefore, all three of the above factors (mass production, full-line production, and wide selection of each car model) were introduced simultaneously in a parallel fashion during the 60s. The author refers to this phenomena as "the simultaneous and parallel development of the three factors."

During the 1960s in Japan, along with the development of the trends towards offering a full-line and a wide-selection of vehicles, there was the need to offer some products which could not be mass produced, consequently, the Japanese manufacturers were confronted with the problem of how to produce a full-line and wide-selection of vehicles on a small scale. In other words they had to find a way to combine mass production with variety in their product line.

One of the ways found to solve this problem was the "Toyota Production System whose premises were the Japanese style small lot production of a large product variety" (Ohno, Taiichi, *Toyota SeiSan Hoshiki* (Toyota Production System), Daiyamondosha, 1978, page 193.) However, the historical chain of reasoning adhered to presently almost completely discounts this point of view. Nowadays, "Toyotism as a form of Post Fordism" is what is now being advocated. Though the author cannot fully support this argument, as for the historical background for the Toyota Production System, during the development of the mass production system in Japan the trend towards offering a full-line and wide-selection of products appeared in a parallel and simultaneous fashion. Under these conditions, the Toyota Production System was generated from earnest efforts to overcome the problem of small lot production of a large variety of products. At any rate, in the discussion of Toyotism's place in history and also in search of the reasons for the miraculous growth of the Japanese automotive industry during the post war period, this fact cannot be overlooked.

In addition, another important point to be considered is that the most important solution to the problem of small lot production of a large variety of products faced in the 60s was the development of outsourcing assembly. On the one hand those vehicles which Toyota produced in their own assembly plants (Motomachi, Takaoka, Tsutsumi, and so on) were the sedan type passenger vehicles produced on a large scale. On the other hand, those vehicles for which Toyota outbased the assembly processes were 1) passenger vehicles such as van and pick-up types produced on a large scale, 2) trucks, 3) passenger vehicles produced on a smaller scale (for example, Century, Toyota 2000GT, and so on[5]), and 4) specially-equipped

5) Century was the most expensive car of the Toyota product line and Toyota 2000GT was a special sporty car.

vehicles produced on a smaller scale. This is how the high degree of outsourcing assembly, 40-50%, developed at Toyota during the 60s.

II Trucks and Vans as the Main Product of "Itaku" Production (the First Half of the 60s)

The greater part of the vehicles outbased by Toyota during the first half of the 60s included the truck product line-up, and the passenger vans as well as the pick-ups. Let us now take a separate look at each of the three firms out of several "itaku" firms involved in the outsourcing of these products: 1) Toyota Shatai Kogyo (Toyota Auto Body) was mainly responsible for the truck production; 2) Kanto Jidosha Kogyo (Kanto Auto Works) was responsible for the production of passenger vans and pick-ups; and 3) Arakawa Shatai Kogyo (Arakawa Auto Body) handled the production of the Land Cruiser and other specially-equipped vehicles.

1 Toyota Shatai (Toyota Auto Body)[6]

What was Toyota Shatai's role in Toyota's full-line-wide-selection production? First of all, let's refer to the products and volume of the "itaku" production. Altogether in 1960 Toyota Shatai was responsible for the assembly production of 74,000 trucks which included; 10,000 large size trucks, 17,000 Stouts, 33,000 Toyo Aces, and 14,000 specially-equipped vehicles. These figures represented practically all of Toyota's production of the Stout and Toyo Ace as well as 85% of its production of larg size trucks. The 74,000 trucks produced by Toyota Shatai in 1960 were 87% of Toyota's truck production and 48% of Toyota's total combined production of trucks and passenger cars. Therefore, in 1960 Toyota Shatai was positioned as an important production base for trucks along with NO. 1 Assembly Line of Toyota Honsha plant.

The brands and volume for "itaku" production four years later in 1964 reveals that the position of Toyota Shatai as an important production point for trucks rose. This is because in 1963 Toyota shifted the production of its Dyna truck to Toyota Shatai and as a result Toyota Shatai gained responsibility for the production of practically all of Toyota's truck models including large size trucks, Stout, Dyna, and Toyo Ace. Toyota Shatai's production of 116,000 trucks in 1964 represented 90% of Toyota's truck production and 27% of its total production.

---

6) Kariya plant of Toyota was separated and became Toyota Shatai as "itaku" assembly specialist for trucks in August 1945. The data on Toyota Shatai is largely obtained from *Toyota Shatai 20 Nenshi* (A 20 History of Toyota Auto Body), 1965 and *Toyota Shatai 30 nenshi* (A 30 History of Toyota Auto Body), 1975.

2 Kanto Jidosha Kogyo (Kanto Auto Works)[7]

Just as Toyota Shatai was an important production base for trucks, Kanto Jidosha Kogyo was an important production base for Toyota's passenger van type vehicles and pick-ups. The total production of vans and pick-ups (commercial vehicles) in 1964 was 65,000 vehicles. Excluding Publica, Kanto Jidosha Kogyo produced almost all of Toyota's vans and pick-ups. Furthermore, vans and pick-ups represented 97% of Kanto Jidosha Kogyo's vehicle production.

Kanto Jidosha Kogyo also performed another important "itaku" production function, although it was small in volume. The firm handled the assembly of non-mass produced luxury cars and during the first half of the 60s they developed and assembled the Crown Eight. At that time, in order to increase the efficiency of their own assembly lines involved in mass production of vehicles, Toyota decided to outbase all non-mass produced vehicles. The total production of the Crown Eight was only around 1,000 vehicles per year and the Crown Eight required many different parts from the Crown for the body, interior and engine. If it were produced together on the same assembly line for the Crown as a mass produced car, it would greatly reduce efficiency, therefore, its assembly was outbased to Kanto Jidosha Kogyo.

From the above information, Kanto Jidosha Kogyo's position in Toyota's full-line-wide-selection production can be described as an important base for vans and pick-ups as well as non-mass produced luxury cars.

3 Arakawa Shatai Kogyo (Arakawa Auto Body)[8]

Arakawa Shatai Kogyo was first and foremost responsible for the production of the Land Cruiser. In 1964 the firm produced 8,000 vehicles or 88% of the total production of this brand. The Land Cruiser was the main exportable product Toyota offered during the period accented with many failures in attempting to penetrate the North American market from the late 50s to the early 60s. From 1956 to 1964 the Land Cruiser represented 28% of all the vehicles Toyota exported. Secondly, Arakawa Shatai Kogyo assembled the Lite Bus and the Stout-van. They were responsible for 90% of the Lite Bus production. Thirdly, they were responsible for the production of many kinds of specially equipped vehicles such as hearse and patrol wagon and so on.

In 1964, altogether Arakawa Shatai Kogyo produced 11,000 vehicles for Toyota which represented 4% of Toyota's total production.

---

7) Kanto Jidosha Kogyo was founded in April 1946 and first produced electromobile and bus body. They received an order for body assembly from Toyota for the first time in December 1948 and after that concentrated on them. The data on Kanto Jidosha Kogyo is largely obtained from *Kanto Jidosha Kogyo 15 nenshi* (A 15 History of Kanto Auto Works), 1963, *Kanto Jidosha Kogyo 25 nenshi* (A 25 History of Kanto Auto Works), 1972 and *Kanto Jidosha Kogyo 30 nenshi* (A 30 History of Kanto Auto Works), 1978.

8) Arakawa Shatai Kogyo was founded in July 1947 and designed, drew and assembled small cars for Toyota. The data on Arakawa Shatai Kogyo is largely obtained from *Arakawa Shatai 25 nenshi* (A 25 History of Arakawa Shatai), 1973.

4 "Itaku" Production in the First Half of the 60s

Above, the position of each firm in Toyota's full-line-wide-selection production of the first half of the 60s was analyzed. This analysis and that of the structure of Toyota's production in the previous paper[9] have been combined together in Figure 4 to illustrate the division of production between Toyota and the "itaku" firms. Basically Toyota produced all the models of sedan type vehicles while it relied on the "itaku" firms for the production of 4 types of vehicles, namely; 1) trucks, 2) mass produced passenger vans and pick-ups, 3) non-mass produced luxury cars, and 4) specially equipped vehicles. In terms of volume, in 1964 Toyota outbased 47% of its vehicle production to the "itaku" firms with the following percentages: 27% for Toyota Shatai, 15% for Kanto Jidosha Kogyo, 3% for Arakawa Shatai, and 2% for Central Jidosha and so on.

Casting/Forging/Machine	Assembly	[Plant]	[Models]
Honsha casting shop Honsha No1 forging shop 〃 No2 〃 〃 No3 〃 Honsha No1 forging shop No2 〃 No3 〃 Motomachi No1 Machine shop 〃 No2 〃 〃 No3 〃 〃 No4 〃	Toyota Shatai	Fujimatsu	Dyna, Toyo Ace
		Kariya	Large Truck, Stout, Specially equipped v.
	Arakawa Shatai	Nagoya	Specially equipped v.
		Honsha	Land Cruiser, Lite Bus, Publica-van
	Toyota	Honsha	Trucks
		Motomachi No1	Crown-sedan, Corona-sedan
		Motomachi No2	Publica-sedan, Publica-van
	Kanto Jidosha	Fukaura	Crown Eight, Corona-pickup, Corona-van
		Taura	Master Line-pick, Master Line-van
	Central	Sagamihara	Master Line-pickup, Corona-pickup

Notes: "v" represents vehicle.

Figure. 4 The Division of Production between Toyota and "Itaku" Firms in 1964

9) Shioji, Hiromi "The Factory Development of Toyota Motor in the 1960's", *Economic Review* [Kyoto University Economic Society], vol. 37 no. 6, 1986.

III The Advent of "Itaku" Production of Sedan Type Vehicles (the Latter Half of the 60s)

Let us now illuminate how the position of "itaku" production changed during the latter half of the 60s as full-line and wide-selection production was being introduced and annual production reached 2 million vehicles.

1 Toyota Shatai

As motorization gained full speed, the new Corona model enjoyed great success and its sales continued to increase; from 1963 to 1965 the number of Coronas produced increased by 5 folds. As for the initial Corona production, the sedans were made at No. 1 Assembly Line of Motomachi plant while the vans and the pick-ups were the responsibility of Kanto Jidosha Kogyo. In order to meet this sudden increase in demand, from 1965 the production of the Corona-sedan and Corona-hardtop was entrusted to Toyota Shatai. The act of entrusting the production of these mass produced passenger cars (sedan and hardtop) represented a change in the Toyota's policy for "itaku" production. In other words, until this action was taken, Toyota had always been responsible for the production of mass produced sedan type and only entrusted the production of passenger van and pick-up, and non mass produced and luxury vehicles such as the Crown Eight. However, after the entrusting the production of the Corona-sedan and-hardtop to Toyota Shatai the former policy was transformed. Toyota strengthened its mass production capacity by entrusting the production of mass produced passenger sedans to "itaku" firms and thus met the explosive demand for vehicles in the latter half of the 60s.

In 1968 Toyota Shatai also became responsible for the production of the Corona MarkII-hardtop and the firm's proportion of passenger car production consequently increased. In 1970 Toyota Shatai's production volume of passenger cars exceeded that of trucks. Therefore, Toyota Shatai was positioned as an important production base for trucks in the first half of the 60s, and later in the latter half of the 60s, they became an important base for mass produced passenger sedans. Furthermore, the latter was to become more important than the former[10].

However, Toyota Shatai continued to be an important base for the production of trucks since it began to handle more models in the latter half of the 60s; the Hi Ace (production started in 1967), Massy Dyna (from 1969), and Lite Ace (from 1970).

In 1970 the vehicle production was 149,000 passenger cars and 142,000 trucks and buses for a total of 291,000 vehicles which represented 14%, 22%, and 18% of Toyota's production of the same, respectively. As far as Toyota Shatai's production of 290,000 vehicles that year compares with that of other auto manufacturers; it is

10) Kanto Jidosha Kogyo also began "itaku" assembly of sedan types of the Crown, Corona and Corolla, and in 1970 car composition ratio reached 36%.

not in the same league as Mitsubishi Jidosha Kogyo's 470,000 vehicles, Toyo Kogyo's (Mazda) 450,000 vehicles, nor Honda Giken Kogyo's 380,000 vehicles, but it is in the same range as Daihatsu Kogyo's 320,000 vehicles, Suzuki's 280,000 vehicles, and Fuji Jukogyo's (Subaru) 230,000 vehicles.

2 Toyoda Jidoshokki Seisakusho (Toyoda Automatic Loom Works)[11]

During the 60s, Toyoda Jidoshokki developed a diversified structure of which the composition was; automatic loom division 30%, automobile division 35%, and industrial vehicle division 33% and others. Here, let us examine the position of its engine production and vehicle assembly

In 1952, Toyoda Jidoshokki produced its first engine which was the S-type engine for the Toyo Ace. In 1959 the S-type engine was replaced by the P-type, which underwent subsequent changes to become the 2P-type in 1961 and the 3P-type in 1967. Toyoda Jidoshokki was partially responsible for the production of the P-type engine series which were used in such strong selling models such as the Corona and the Toyo Ace. Furthermore, Toyoda Jidoshokki handled the production of all the large J-type diesel engines (used in the Dyna)[12] and the D/2D-type engines (used in large trucks). During the 60s they were the only "itaku" firm entrusted with the production of engines. The production volume in 1970 was 86,000 for the P-series, 13,000 for the J-series, and 11,000 for the D-series. The total engine production for that year was 110,000 which represented 7% of all Toyota's engine production. Therefore, Toyoda Jidoshokki may be considered as an important base of engine production, in particular large diesel engines.

Toyoda Jidoshokki's engine production was carried out at the casting shop of Ohbu plant and machine shop of Kyowa plant. The scale of these shops was small, however, they had the same processes as casting shops and machine shops of Toyota's Kamigo plant. These Toyoda Jidoshokki's shops were parts of "Toyota Full-Line Engine Production".

Next, let us take a look at its vehicle production. Above all, the company was a base for specially equipped vehicles. In the first half of the 60s they produced 1,000 to 10,000 Weapon Carriers annually, while in the latter half of the 60s they produced 1,000 special vehicles annually such as small dump trucks. Thus, along with Toyota Shatai and Arakawa Shatai, Toyoda Jidoshokki was one of the three main bases of specially equipped vehicle production. Secondly, they began producing the Publica-van and the Mini Ace in 1967. At first the production of the Publica-van was divided between Toyoda Jidoshokki and Hino. Toyoda Jidoshokki Nagakusa plant handled the production for western Japan while Hino's Hamura

11) Toyoda Jidoshokki Seisakusho was founded in 1926 in order to produce the Toyoda automatic loom that Sakichi Toyoda invented. In 1933 they began to produce automobiles domestically and subsequently its automobile division was separated and became Toyota Motor. After WWII, they began to produce automobile engines since 1952, specially equipped vehicles since 1953 and Fork Lift since 1956. The data on Toyoda Jidoshokki Seisakusho is largely obtained from *Yonju nenshi* (A 40 History), 1967.

12) J-type diesel engines were also used for Fork Lift and Shovel Loader.

plant handled that for eastern Japan. However, later with decreasing demand for the Publica-van, Hino stopped production of the said product in August 1970 and its production became concentrated at Toyoda Jidoshokki Nagakusa plant. Furthermore, Toyoda Jidoshokki was responsible for all the production of the Mini Ace. In 1970, they produced 50,000 Mini Aces which represented 3% of all of Toyota's vehicle production that year.

3 Central Jidosha (Central Motors)[13]

Central Jidosha was firstly a base of pick-up type passenger vehicles, and served as a supplementary base to Kanto Jidosha which was the main base for van and pick-up type passenger vehicles. In 1970, Central Jidosha produced 53,000 pick-up type passenger vehicles of the Crown, the Corona, and the Corona MarkII. Secondly, it was a base for special vehicles, and in 1968 they produced 1,967 convertible type Publica S vehicles and 198 ambulances. Its total vehicle production in 1970 was 53,000 which represented 3% of that of Toyota's.

4 Yamaha Hatsudoki (Yamaha Motors)[14]

Yamaha was responsible for the prototyping and final assembly of the non-mass produced Toyota 2000GT sports car. The 2000GT was conceived at Toyota in 1964, however, Toyota did not have sufficient ability to handle such a vehicle so they entrusted it to the motorcycle manufacturer Yamaha who had extensive experience in international racing and thus had the technical ability to handle the prototyping and production of the vehicle. The prototyping was completed in 1965 and production started in from November 1966. Thereafter the annual production was 157 vehicles for 1967, 61 vehicles for 1968, 50 vehicles for 1969, and 71 vehicles for 1970.

5 Hino Jidosha Kogyo (Hino Motors)

Hino Jidosha Kogyo, an auto manufacturer, ran into financial trouble in the early 60s with the production and sales of the Contessa, which was the first car they designed and manufactured by themselves, which did not succeed in the market. In order to overcome its financial difficulties, Hino entered into a tie-up agreement with Toyota in 1966[15]. Some of the contents of the agreement were: 1) Hino would concentrate on the production of large vehicles such as large trucks and buses and give up the production of small vehicles; 2) in return, Toyota entrusted the production of their small trucks and cars to the Hino Hamura plant; and so on.

---

13) Central Jidosha was founded in September 1950 and began "itaku" assembly for Toyota in April 1956. The data on Central Jidosha is largely obtained from *30 nen no ayumi* (30 Year Journey), 1980.

14) Yamaha Hatsudoki was separated from Nihon Gakki and was founded in 1955. They have the second place in the world as a motorcycle manufacturer.

15) For further details of this tie-up, see Shioji, Hiromi "An Historical Study of the Hino-Toyota Tie-up", *Japan Business History Review*, vol.23 no.2, 1988. The data on Hino Jidosha Kogyo is largely obtained from *Hino Jidosha Kogyo 40 nenshi* (A 40 History of Hino Motors), 1980.

From April 1967 Hino began to perform "itaku" production for Toyota. (Table 3, Figure 5-1, 5-2 and 5-3) First, Hino became a production base for the Toyota-Briska (later called the Hi Lux). This vehicle was based on the Hino Briska. Toyota's technology was applied in order to make sweeping improvements and eleven common parts with Toyota vehicles were employed. Thereafter, the vehicle changed its name to the Toyota Briska. Later in March 1968, the vehicle became the Hi Lux in the process of model changing and the number of common parts was increased by using the Toyota 2R-type engine among other parts[16]. In 1969, 48,000 Hi Lux vehicles were produced and from that point in time to today the vehicle continues to be the truck model with the highest production volume. Secondly, Hino became the production base for the Publica-van and-sedan for the eastern Japan. In other words, as mentioned earlier, in 1966, due to the increased production of the Corona, the production of the said vehicle was moved from No. 1 Assembly Line of Toyota's Motomachi plant (where the Crown was co-produced) to the No. 2 Assembly Line of Toyota's Motomachi plant in order to solely concentrate on

Table 3 Toyota's Shares of Hino and the Directors from Toyota at Hino

	Toyota's Shares(%)	Ranking of Toyota (place)	Total Number of Directore of Hino (persons)	Directors from Toko-ta (persons)	Hierarchical Position of Directors from Toyota
1967	2.00	7th	22	1	D
1968	2.64	5th	21	〃	〃
1969	4.81	3rd	〃	〃	〃
1970	〃	〃	〃	〃	〃
1971	〃	1st	22	〃	〃
1972	6.75	〃	〃	〃	〃
1973	6.79				
1974	7.05	〃	〃	2	ED, D
1975	6.98	〃	〃	〃	〃
1976	6.80	〃	25	〃	〃
1977	7.34	〃	〃	〃	〃
1978	8.07	〃	27	〃	〃
1979	7.94	〃	28	〃	VP, D
1980	9.14	〃	〃	〃	〃
1981	9.83	〃	〃	〃	〃
1982	9.75	〃	30	3	VP, MD, D
1983	10.34	〃	29	2	MD, D
1984	11.21	〃	29	〃	ED, D
1985	11.31	〃	31	4	C, ED, D, A

Source: Yuka shoken hokokusho of Hino Jidosha Kogyo

Notes: As of the end of September only in 1968. The other years are as of the end of March. C, VP, ED, MD, D and A represent Chairman, Vice President, Executive Director, Managing Director, Company Director and Auditor respectively.

16) As the result that Hino used some parts made by Toyota or Toyota's keiretsu parts suppliers, Hino's keiretsu parts suppliers were damaged. For further details, see "Looking into the tie-up between Toyota and Hino", *Nikkan Jidosha Shinbun*, October 26, 1966.

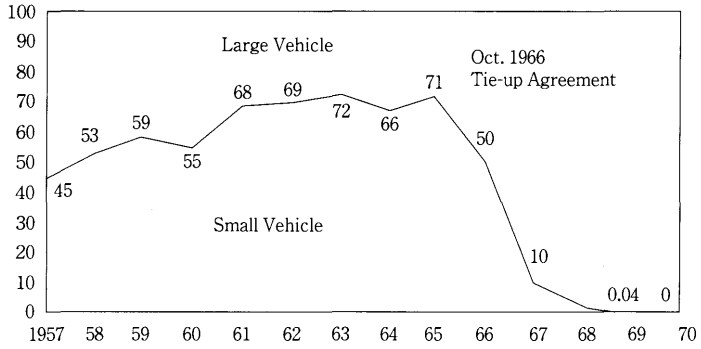


Figure. 5-1 Large Vehicle/Small Vahicle Ratio at Hino

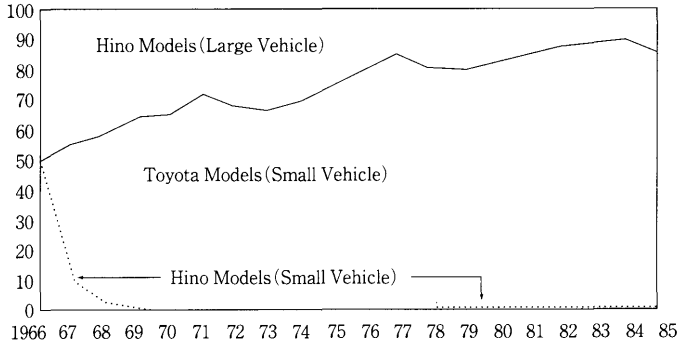


Figure. 5-2 Hino Models/Toyota Models Ratio by Number at Hino

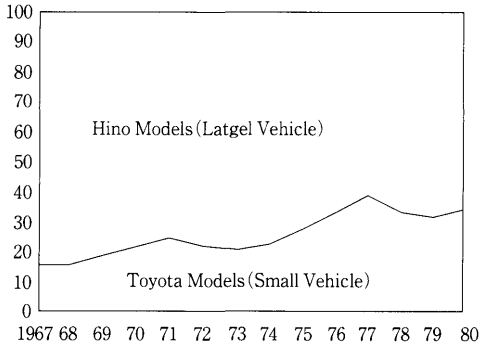


Figure. 5-3 Hino Models/Toyota Models Ratio by Sales Amount at Hino

Source: Yuka shoken hokokusho of Hino Jidosha Kogyo
Note: In Figure 5-3, in 67, 68 and 78～80, Hino Models (Small Vehicle) were assembled, but their sales amount is not known

Figure. 5 "Itaku" Production of Toyota Models at Hino Jidosha Kogyo

that of the Corona. Therefore, the production of the Publica which had been assembled at the No. 2 Assembly Line of Motomachi plant was shifted to other plants. The Publica-sedan was transferred to Toyota's Takaoka plant and the production of the Publica-van for western Japan was moved to Toyoda Jidoshokki's Nagakusa plant and that for eastern Japan to Hino's Hamura plant. Furthermore, thereafter when the production of the Corolla was increased, Takaoka plant dedicated all of its production capacity to this vehicle. Thus, the production of Publica-van for western Japan was entrusted to Daihatsu's Ikeda plant and that for eastern Japan to Hino's Hamura plant. In 1970, Hino produced 105,000 vehicles for Toyota which represented 6% of the latter's total production.

6 Daihatsu Kogyo (Daihatsu Motor)[17]

Daihatsu, as in the case of Hino, entered into a tie-up agreement with Toyota when faced with financial difficulties in 1967. The contents of the agreement were: 1) Daihatsu would focus its emphasis on mini cars and mini trucks; and 2) Toyota would outbase the production of a few cars and trucks to Daihatsu's Ikeda plant.

After signing the agreement in 1967, from September 1969, the production of the Publica-sedan was undertaken by Daihatsu's Ikeda plant and in October 1970, Daihatsu began "itaku" production of the Lite Ace for Toyota. As previously mentioned, the production of the Publica-sedan was shared among Daihatsu's Ikeda plant and Hino's Hamura plant. The "itaku" production of the Lite Ace was also divided according to its sales region among Daihatsu's Ikeda Plant and Toyota Shatai's Kariya Plant with Daihatsu receiving 40% of the production. In this manner Daihatsu became a production base for western Japan for mass produced sedans and small trucks.

However, the most remarkable point to consider concerning Daihatsu's "itaku" production is the development of the use of common parts between Toyota and Daihatsu. In other words, after the tie-up between Toyota and Hino, the latter had to completely cease production of small vehicles. In contrast, after the tie-up between Toyota and Daihatsu, the latter continued the production of their own small vehicles. In order to reduce the cost of Daihatsu's small car production and increase the demand for parts made by Toyota, 80% of the parts that Daihatsu used in its small cars came from Toyota. After the tie-up, 80% of the parts used for Daihatsu's Consorte Belrina were common with the Publica and both vehicles were produced together on the same line at Daihatsu's Ikeda plant. In the same manner, the Delta of Daihatsu introduced in 1970 and the Dyna of Toyota as well as the Delta 750 of Daihatsu introduced in 1971 and the Lite Ace of Toyota all shared common parts. Furthermore, the Delta 750 and the Lite Ace were assembled together on the same line at Daihatsu's Ikeda plant.

---

17) The data on Daihatsu Kogyo is largely obtained from *50 nenshi* (A 50 History), 1957, *60 nenshi* (A 60 History), 1967, *Daihatsu 70 nen shoshi* (A Concise 70 History of Daihatsu), 1967 and *Moete Kakete Daihatsu 80 nen no Ayumi* (Ardent and Run, 80 Year Journey of Daihatsu), 1987.

In 1970, Daihatsu produced 34,000 vehicles for Toyota which represented 2% of the latter's total production.

7 "Itaku" Production in the Latter Half of the 60s

Figure 6 gives the distribution of "itaku" production in 1970. First, let us compare the characteristics of "itaku" production during the first half of the 60s with that of the latter half of the 60s. First of all, there is the beginning of the "itaku" production of mass produced sedan type vehicles and the subsequent increase in such "itaku" production. Toyota was unable to meet the explosive demand for passenger cars in the latter half of the 60s by using only its own facilities, thus Toyota

Casting／Forging／Machine	Assembly	(Plant)	Sedan	Van and Pick-up	Truck and Bus	Non-Mass
Honsha Casting Shop	Yamaha	Iwata				Toyota 2000GT
Kamigo No1 Casting Shop	Toyota Shatai	Fujimatsu	Corona Mark II		Large Truck, etc.	
〃 No2 〃		Kariya			Hi Ace, etc.	Specially equipped. v.
〃 No3 〃						
〃 No4 〃						
Tsutsumi Casting Shop	Arakawa Shatai	Sarunage			Large Truck, etc.	Specially equipped. v.
Honsha No1 Forging Shop		Honsha			Land Cruiser, etc.	
〃 No2 〃						
〃 No3 〃						
Honsha No1 Machine Shop	Toyota	Honsha			Trucks	
〃 No2 〃		Motomachi	Corona Mark II, etc.			
〃 No3 〃		Takaoka	Corolla, Sprinter			
〃 No4 〃		Tsutsumi	Carina, Celica			
Motomachi No1 Machine Shop	Kanto Jidosha	Yokosuka	Corolla, Crown	Corolla-van		
〃 No2 〃		Higashifuji	Corona	Corolla-van		Century, etc.
〃 No3 〃						
〃 No4 〃						
Kamigo No1 Machine Shop	Central	Honsha		Corona-pickup, etc.		Ambulance, etc.
〃 No2 〃	Toyoda Jidoshokki	Kyowa				Specially equipped. v.
〃 No3 〃		Nagakusa	Publica	Publica-van	Mini Ace	
〃 No4 〃						
〃 No5 〃						
〃 No6 〃						
〃 No7 〃						
〃 No8 〃						
〃 No9 〃						
〃 No10 〃						
Miyoshi No1 Machine Shop	Daihatsu	Ikeda	Publica		Lite Ace	
No2 〃						
No3 〃						
Tsutsumi Machine Shop	Hino	Hamura		Publica-van	Hi Ace	

Figure. 6 The Division of Production between Toyota and "Itaku" Firms in 1970

strengthened its mass production capacity by entrusting the production of the excess demand to "itaku" firms. Secondly, during the latter half of the 60s Toyota continued to increase the number of models and volume of the 4 types of vehicles of which Toyota relied on the "itaku" firms for production during the first half of the 60s, namely; 1) trucks, 2) mass produced passenger vans and pick-ups, 3) non-mass produced luxury cars, and 4) specially equipped vehicles. As shown earlier in Table 1, in 1970 the "itaku" production of vehicles represented about 51% of Toyota's total volume.

Generally speaking, it is clear that as Toyota had achieved an annual volume of 2 million vehicles and developed a full-line and wide-selection of products by the beginning of the 70s, "itaku" production had come to play an indispensable supplementary role. It is also clear that within the framework of Toyota's full-line-wide-selection production system each of the "itaku" firms' production plants became an integral part of the system.

IV The Function of "Itaku" Production

Above we took a look at the role "itaku" production played in Toyota's full-line-wide-selection production system during the 60s. Here, let us take a look at the function of "itaku" production while keeping in mind the peculiar historical characteristic of "the simultaneous and parallel development of the three factors" which occurred in the 60s in Japan.

Firstly, by entrusting the production of non-mass produced vehicles to "itaku" firms and concentrating on mass production of sedan type vehicles in their own plants, Toyota was able to reach the highest levels of efficiency and reduce costs. As we have seen earlier, Toyota entrusted to "itaku" firms not only the production of vehicles with an annual volume of only a few hundred vehicles such as specially equipped vehicles and luxury cars (the Century among others) but also the majority of its trucks, as well as mass produced passenger vans and pick-ups. The reason for this is because, it is possible to attain greater production efficiency by assembling just sedans on one production line rather than a mix of sedans and vans.

Secondly, there was also the function of "body rotation" among "itaku" firms and Toyota to deal with fluctuations in demand of the various models. For example, if Toyota experienced a sudden increase in demand for a mass produced passenger sedan, then they were able to cover the demand by increasing the production at the various "itaku" firms which were producing the same vehicle. In this way "itaku" production functioned as a method of suddenly increasing the production capacity of mass produced vehicles. During the latter half of the 60s when Toyota was experiencing explosive demand for passenger vehicles, "itaku" production played an important role in meeting the excess demand for such strategic vehicles as the Corolla.

Furthermore, this function is not limited to meeting increased demands, rather it serves to deal with the fluctuations in demand over the long run. One example is

how "itaku" production was used to deal with the fluctuations in demand for the Publica by shifting production a number of times among the plants. The production of the Publica was shifted around in the following way: the Arakawa Shatai's Toyama plant was used during the prototyping period; around the period the Publica was put on the market, the No.1 Assembly Line of Toyota's Motomachi plant was used; then during the first half of the 60s when the demand for the Publica was increasing, the No. 2 Assembly Line of Motomachi plant was exclusively devoted to its production; later in the latter half of the 60s when demand was down, the production of the sedan was moved to the No. 1 Assembly Line of Toyota's Takaoka plant (later to the No. 2 Assembly Line of Takaoka plant); the van was entrusted to Toyoda Jidoshokki's Nagakusa plant and Hino's Hamura plant; by the end of the 60s the sedan was entrusted to Daihatsu Ikeda plant and Hino Hamura plant; when the van production was reduced, it was consolidated to Toyoda Jidoshokki's Nagakusa plant.

Furthermore, through this body rotation, profit sharing and risk sharing have been carried out among the members of the Toyota group. This can be ascertained by observing that the breadth of the fluctuations in demand and production over the long-run for each of the firms in Toyota group does not vary to a great extent. Also it can be seen in Table 4 that when there was a dip in the demand for Hino's own independent large trucks and buses, Toyota intentionally increased the "itaku" production entrusted to Hino[18].

Thirdly, by entrusting the same model and same body type to two or more different "itaku" firms, "itaku" production functions to create competition among these firms concerning such points as price, delivery, and quality. In other words, Toyota is able to demand the "itaku" firms with low performance levels bring themselves up to par with those having high performance levels. This type of competition has been used with parts procurement by having two or more parts manufacturers produce the same part and thus the same method was first introduced to "itaku"

---

18) See TABLE 4. First, out of all 20 years from 1966 to 1985, we can ignore the case that both Hino and Toyota models increased compared to the previous year. For example, 1966 to 1970, 1972, 1973, 1979 and 1984. These 9 years can be ignored because these cases were no problem for either firms. Therefore 11 years are left. Secondly, out of these 11 years, in 10 years fluctuations for two firm were reverse. I insert circles for these 10 years at the lowest line. For example, In 1971 Hino models decreased, but Toyota models increased. And 1975 to 1977 and 1980 to 1983 are same cases. On the other hand, in 1978 and 1985, Hino models increased, but Toyota models decreased. Fluctuations for two firms were reverse. Therefore we can derive that when Hino models increased, Toyota decreased "itaku" assembly to Hino, when Hino models decreased, Toyota increased "itaku" assembly to Hino. Lastly, in 1974 both models decreased, but this year was the depression year caused by the first oil crisis. This year is only exceptional case. According to this analysis, we can assume that profit sharing and risk sharing have been made between Toyota and Hino and moreover, among the Toyota group.
On this subject, see Shiomi, Haruhito "The Formation of Assembler Networks in the Automobile Industry: The Case of Toyota Motor Company (1955-1980)", Shiomi, Haruhito & Wada, Kazuo (eds.) *Fordism Transformed: The Development of Production Methods in the Automobile Industry* (Fuji Business History Series.) 1995. Seike, Akitoshi also took a detailed look at this type of body rotation in *Nihon no Soshiki kan kanri* (Management in Japanese Organizational Relations), Hakuto Shobo, 1995.

Table 4 Fluctuations of Hino Models and Toyota Models assembled by Hino at Hino's Hamura Plant

	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Fluctuation of Hino Models	↑	↑	↑	↑	↑	↓	↑	↑	↓	↓	↓	↓	↑	↑	↓	↓	↓	↓	↑	↑
Fluctuation of Toyota Models	↑	↑	↑	↑	↑	↑	↑	↑	↓	↑	↑	↑	↓	↑	↑	↑	↑	↑	↑	↓
Cases where fluctuations for the two firms' models are reverse						○				○	○	○	○		○	○	○	○		○

Source: Yuka shoken hokokusho of Hino Jidosha Kogyo
Notes: ↑ and ↓ mean increase and decrease compared to the previous year respectively.

production in the latter half of the 60s[19]. Furthermore, in this type of competition, the firm with outstanding performance during the year receives an order for an increase in volume the following year.

Fourthly, "itaku" production can function to reduce the cost of the parts Toyota uses by having the "itaku" firms use the same parts on their own independent vehicle models and independent products. Having Daihatsu and Toyoda Jidoshokki increase their use of the same parts used on Toyota vehicles can be given as an example.

The fifth function of "itaku" firms is the development of vehicle bodies. In other words, "itaku" firms have been responsible for developing new models and full model changes. For example, in the 60s Kanto Jidosha Kogyo was in charge of the development of the Corona, Century, and Corona MarkII bodies. At present in 1996, around 40% of all the vehicles developed are done by "itaku" firms. As seen in Figure 2, in 1993 Kanto Jidosha Kogyo was in charge of the development of 16 vehicle models, of which 5 were then parceled out to Toyota and other "itaku" firms for production (a so called "Reverse Overture" where the "itaku" firm develops and designs the vehicle and Toyota produces it). In reference to this development function it is more appropriate to call such firms ["itaku" development and assembly firms] rather than simply ["itaku" assembly firms].

Generally speaking, on the one hand Toyota was not able to keep up with the sudden increase in demand by using only its own facilities, and on the other hand as a result of the fast introduction of a full-line and wide-selection of products there were some models and body types that could not be adapted to mass production. Under these conditions "itaku" production was indispensable and played an impor-

19) This type of competition in "itaku" assembly is still used up to now. The president of Toyota, Hanai(at the time) stated "Assembly is also competition. Profits are generated from competition.", in the article of *Shuakan Toyo Keizai*, July 1, 1982. After that statement in the article, an executive of an "itaku" firm explained how cheap the "itaku" assembly commission was.

tant role in Toyota's full-line-wide-selection production[20].

V Significance of the Establishment of Full-line-Wide-selection Production

Toyota established the full-line-wide-selection production during the 60s, as discussed in previous papers[21] concerning the development of Toyota's production facilities. The development of "itaku" production supplemented Toyota's such multi-factory structure. These structures made possible the realization of full-line production and an annual volume of 2 million vehicles.

Taking a quick look at the case of Nissan, we can see in Table 5 that just like Toyota, Nissan used "itaku" production to supplement its own production plants and develop full-line-wide-selection production and attain a volume of 1.5 million vehicles[22].

On the other hand, the "itaku" production of the lower ranking firms is very small in scale or non-existent. In this point the difference in the production structure between the Big 2 (Toyota and Nissan) and the lower ranking firms was actualized.

Therefore, including the analysis in the previous paper, the difference in the structure of the production facilities between the Big 2 and lower ranking firms in 1970 is given in Table 6. Here, looking at the production structure of the Japanese automotive industry in 1970, the concrete existence of "transfer barriers" between the Big 2 and lower ranking firms can be seen.

Thus, what is the significance of the establishment of full-line-wide-selection production? Here we will take a look at how Toyota was able to increase its predominance in the competition with the other firms in the industry and increase dominance over the market by the creation of these structures.

First of all, based on its full-line-wide-selection production Toyota was able to differentiate its products and thus increase competitiveness. In other words, the number of models of passenger vehicles offered by the automotive manufacturers was; 10 for Toyota, 9 for Nissan, and 4 for the lower ranking firms. This difference in model offerings had a large and significant effect on the competitiveness of the manufacturers. Firms offering a full-line of products were better able to meet the needs of the users and obtained a wider level of consumer demand. Furthermore, when the vehicles were replaced, the firms with a full-line selection of products were able to switch the customer to one of their other model (usually a higher ranking model) and thus develop an exclusive sales policy. Moreover, when the demand for

---

20) In this paper, we do not point out the differences between Toyota and "itaku" firms in terms of working conditions, for example wage and so on. In the future, we plan to examine the role of "itaku" assembly production from a different angle.

21) Shioji, 1986, op. cit. and Shioji, Hiromi "The Development of the Wide-Selection Production System by Toyota in the 1960s", *Economic Review* (Kyoto University Economic Society), vol. 141, no.1, 1988.

22) Nissan like Toyota, entrusted i) trucks, ii) van and pickups, and iii) specially equipped vehicles also, but they assembled the non-mass produced luxury car, the President at their own plant.

Table 5 Nissan Plants and "Ikaku" Firms in 1970

[Nissan Plant]	
Oppama	President, Cedric-sedan, Bluebird-sedan, Sunny-sedan, etc.
Zama	Sunny-sedan, Cherry-sedan, Datsun-truck, Nissan-truck, etc.
Murayama	Skyline-sedan, Skyline-van, Laurel-sedan, Datsun-truck, etc.
Tochigi	Cedric-sedan, Cedric-van, Gloria-sedan, Gloria-van, etc.
["Itaku" Firm]	
Nissan Shatai	Fairlady, Bluedird-van, Sunny-sedan, Sunny-van, etc.
Fuji Jukogyo	Sunny-coupe
Aichi Kikai	Sunny-truck, Cherry-cab
Isuzu	Cherry-van
Press Kogyo	Nissan Bus, Patrol, Weapon Carrier
Nissan Diesel	——

Source: *Nissan Jidosha shi* (Histoty of Nissan Motor), 1975

Table 6 The Difference in the Production Structure between the Big 2 and Lower Ranking Firms

	Big 2 (Toyota, Nissan)	Lower ranking Firms
Plant Development	Multi Plants	Single Plant
"Itaku" Production	20-50%	Small or Non-existent
Production Scale per Year	2 million (Toyota) 1.5 million (Nissan)	Less than 0.5 million
Product Line	Full-Line Products	Undeveloped Full-Line(Mitsubishi, Isuzu, Toyo Kogyo) Mini Car, Truck (Daihatsu, Fuji, Suzuki, Honda) Large Truck, Bus (Hino, Nissan Diesel)

each model fluctuates, the firms with a full-line of products have more flexibility than those firms without a full-line or specialist firms. In light of each of these points Toyota was able to increase its domination of the market.

Secondly, Toyota was able to expand the scale of its mass production based on its full-line-wide-selection production and increase its production efficiency, thus reducing costs and enabling itself to increase its price competitiveness. However, it is not the intention of this paper to discuss the issue of the relationship between the total production scale of a firm and lower total costs. In this paper, by analyzing the position and function of "itaku" production, it is sought to explain the peculiar historical characteristic of "the simultaneous and parallel development of the three factors" in the Japanese automotive industry during the 60s, or in other words how Toyota was able to develop a mass production structure and increase the effects of mass production to better compete with other firms under the conditions of the trend

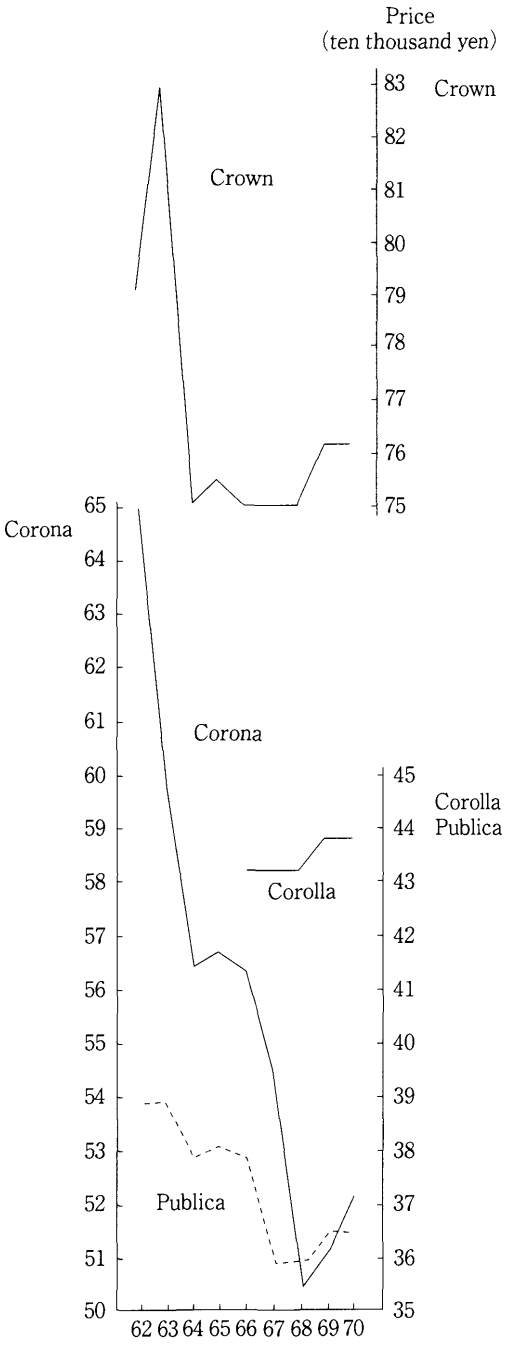
towards variety of products and small lot production. Here, we would like to point out in particular the fact that Toyota's abilitye to increase the production efficiency of its own plants by entrusting the production of non-mass produced models and van and pick-up body types to "itaku" firms was an important determining factor in its competitiveness against other firms in the 60s. In the 60s the largest market segment was that of sedans in the 800cc to 1800cc engine size range. A firm's share in this market segment determined its competitiveness in relation to other firms. Toyota introduced strategic vehicles one after the other in this segment such as the Publica, Corolla, Sprinter, Carina, and so on. Here it should be pointed out that the majority of the production of these strategic sedan type vehicles was not entrusted to "itaku" firms, rather they were produced by Toyota in its own plants. Furthermore, when new models of these strategic vehicles were introduced, they were produced in the best and most capable Toyota plants. By doing so Toyota was able to establish mass production of strategic vehicles and increase its price competitiveness in this market segment. This was one of the reasons for the several price reductions for the Corona and the low cost of the Publica and Corolla in relation to the price of vehicles in the same segment offered by other firms[23].

As we discussed the above two points, Toyota was able to increase its competitiveness by establishing a full-line-wide-selection production, and raised its share in the small size segment from 36.7% in 1964 to 44.4% in 1970. Nissan also raised its share from 31.9% to 36.4%, with the total of both firms reacing to 80.8%. On the other hand, among the lower ranking firms, there were companies that exited out of this segment (Hino, Suzuki) or decreased their offerings of this segment (Fuji, Daihatsu, Isuzu) and could not avoid specializing in mini vehicle segment (Daihatsu, Fuji, Suzuki, Honda) or the large truck and bus segment (Hino, Nissan Diesel). Looking at the share of total production, you see that in the latter half of the 60s Toyota and Nissan quickly increased their share while the lower ranking firms, with the exception of Honda, all had stagnant or decreasing shares. At the same time, tie-ups among some firms progressed and the Toyota group (Toyota, Hino, Daihatsu) and the Nissan group (Nissan, Nissan Diesel, Fuji) were formed.

Figure 7 shows the price movements of passenger cars of Toyota. It can be ascertained that from 1969, falling prices were reversed and thereafter the prices were controlled by Toyota and Nissan. From there on, the price continued to rise at each model change. As pointed out in previous researches, oligopolistic competition, controlled by Toyota and Nissan, in the Japanese auto industry was established by the end of the 60s. Then, in 1970, as seen in Figure 8, each firm had established its basic position in terms of competitive structure.

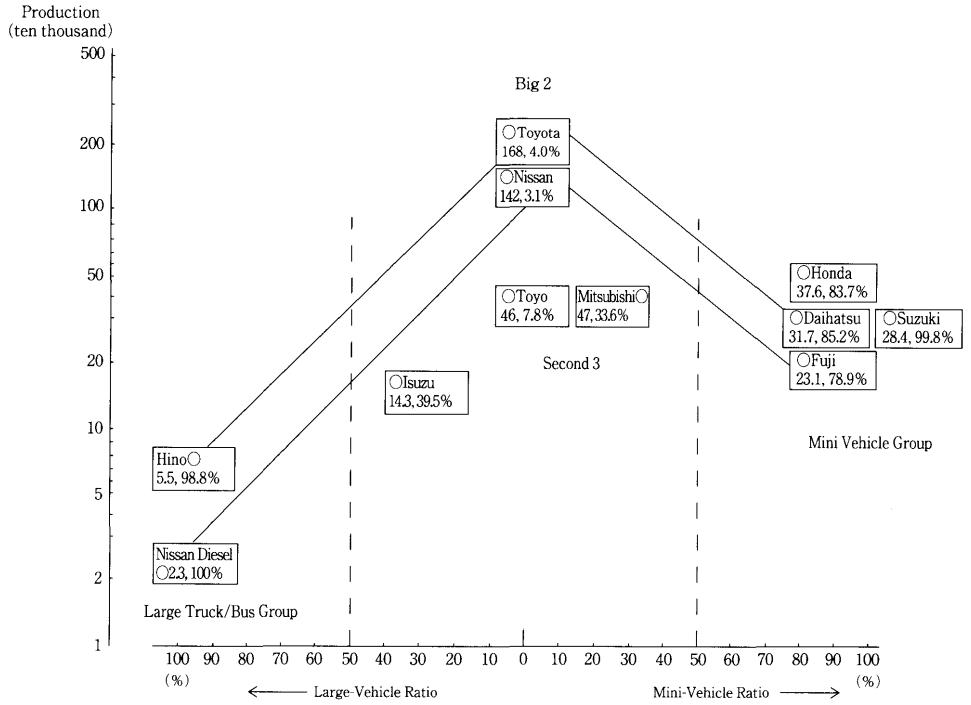
As the base of the establishment of this oligopolistic competition in the

23) The price of Corona was 649 thousand yen in 1961, after that, Toyota continually reduced prices to 599 thousand yen in 1963, 564 thousand yen in 1967, 544 thousand yen in 1967, and to 504 thousand yen in 1968. Besides, during this period its engine was upgraded from 1000cc to 1500cc, considering this point, the reductions of price were even more important.



Source: Yuka shoken hokokusho of Toyota

Figure. 7 The Price Movements to Passenger Cars of Toyota



Source: Nihon Jidosha Kogyo kai (JAMA)"Jidosha Tokei Geppo"

Notes: The horizontal axis represents the composition ratio among three divisions, large vehicle, small vehicle and mini vehicle. That is to asy, in the case of the firms that produce large vehicle and small vehicle like Toyota, Nissan, Isuzu and Hino, large vehicle composition ratio is shown. In the case of the firms that produce small vehicle and mini vehicle like Honda, Suzuki and Fuji, mini vehicle composition ratio is shown. And in the case of the firms that produced three divisions like Mitsubishi, Mazda and Daihatsu, absolute value of [large vehicle composition ratio minus mini vehicle composition ratio] is shown. The vertical axis shows the number of production per year on logarithmic scale. Regarding the numerals under the name of firms, the left side numerals indicate the number of production per year (ten thousand) and those on the right indicate the composition ratio. Bold lines between firms measn tie-up relations.

Figure. 8 Division of Japanese Auto Manufacturers in terms of Competitive Structure

Japanese auto industry, we can find a structural difference between the Big 2 (Toyota and Nissan) and the lower ranking firms in terms of the formation of full-line and wide-selection production.